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<p>(21) International Application Number: PCT/AU93/00537</p> <p>(22) International Filing Date: 20 October 1993 (20.10.93)</p> <p>(30) Priority data: PL 5360 20 October 1992 (20.10.92) AU</p> <p>(71)(72) Applicant and Inventor: ROBINSON, Alec [AU/AU]; 465 Victoria Street, West Melbourne, VIC 3003 (AU).</p> <p>(74) Agent: GRIFFITH HACK & CO; 509 St. Kilda Road, Melbourne, VIC 3004 (AU).</p> <p>(81) Designated States: JP, KR, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p>		Published <i>With international search report.</i>
<p>(54) Title: EYE SCREEN MEANS WITH MOUNTED VISUAL DISPLAY AND COMMUNICATION APPARATUS</p>		
<p>(57) Abstract</p> <p>Eye screen means with mounted visual display (50) and communication apparatus (60). According to one aspect there is provided eye screen means such as a pair of spectacles (10) incorporating a receiver, an alphanumeric display (50), and means to display an alphanumeric message sensed by the receiver through the medium of the alphanumeric display (50).</p>		

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TITLE

15 **EYE SCREEN MEANS WITH MOUNTED VISUAL DISPLAY
AND COMMUNICATION APPARATUS**

BACKGROUND ART

20 This invention relates to eye screen means with mounted visual display and communication apparatus. People who are forced to wear eye screen means such as prescription spectacles or sunglasses often also have a need to wear watches, carry communication paging devices or even carry portable telephones.

25 It is an object of this invention to combine the eye screen such as spectacles with one or more of the other items discussed above.

SUMMARY OF THE INVENTION

30 According to one aspect of the present invention there is provided eye screen means such as a pair of spectacles incorporating a receiver, an alphanumeric display, and means to display an alphanumeric message sensed by the receiver through the medium of the

alphanumeric display. The receiver may be directly in the eye screen means such as in the spectacle frames or it may be separate but suitably interconnected therewith, such as by cable.

5 The alphanumeric display may be liquid crystal display and may be positioned on the frame of the spectacles or alternatively may be positioned across a portion of the one or both the lenses of the spectacles.

According to another aspect of the present
10 invention there is provided wearable eye screen means in the form of a pair of spectacles coupled to a power pack assembly via a detachable flexible lead, the temples of the spectacles including ear phones, a microphone being positioned in the frame of the spectacles whereby the eye
15 screen means operates as a telephone.

Preferably the telephone is a mobile cellular telephone. Alternatively, the telephone may be adapted to receive signals from a base transmittal positioned in the proximity of the wearer of the spectacles.

20 In a preferred embodiment, the eye screen means described above may incorporate solar cells and/or button batteries to provide a source of electricity. Furthermore, the eye screen means may incorporate light or sound emitting devices to warn the user of the presence of a
25 paging message or telephone contact.

It is also envisaged that the paging characteristics be coupled with the telephone characteristics so that the display of the pager can be used as a personal notebook in conjunction with the
30 keyboard.

In a preferred embodiment, the spectacles may incorporate a time chip that can provide indication of time, preferably in hours, minutes, seconds, date, month, day and year as well as elapsed time. Other features may

include the addition of temperature sensors, providing a display of surrounding air temperature on the display, and a radio receiver for either AM or FM radio waves.

According yet another aspect of the present invention, eye screen means such as a pair of spectacles includes a display positioned on eye screen means such as on the lenses of the spectacles, with an optical system arranged so that the display can be readily viewed by the wearer of the eye screen means notwithstanding the fact that the lenses of the spectacles are positioned very closed to the eye of the wearer.

DESCRIPTION OF THE DRAWINGS

Various embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 is a perspective view taken from the rear of eye screen means in the form of a pair of spectacles,

Figure 2 is a perspective view of the front of the spectacles,

Figure 3 is a perspective view of the rear of the pair of spectacles illustrating a second embodiment,

Figure 4 is a front view of the spectacles shown in Figure 3, and

Figure 5 is a view of the rear of a pair of spectacles in a different embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The spectacles or sunglasses illustrated in the accompanying drawings are essentially similar to conventional spectacles that may be used with prescription lenses or sunglasses. The spectacles 10 include a frame 11 comprising a bridge 12 with a pair of downwardly projecting

rims 13, 14 separated by a nose bridge 15. The rims 13, 14 support either prescription lenses 20, 21 or shaded glass or plastics for use as sunglasses. An elongate arm 30, 31 or temple is pivotally secured at each side of the frame 5 via a hinge 32, 33. The spectacles 10 are designed to be worn in an entirely conventional manner with the temples 30, 31 resting on the top of the ears and the nose bridge 15 resting on the nose of the wearer with the lenses 20, 21 positioned a short distance in front of the eyes of the 10 wearer.

The spectacles described above have been adapted to carry a wide range of electrical/electronic componentry and thus it is important that the frame 11 and lenses 20, 21 of the spectacles are constructed to be as light as 15 possible so that the overall assembly is not uncomfortably heavy.

The spectacles illustrated in the accompanying drawings are designed to provide a variety of functions. In the embodiment shown in Figures 1 and 2 the spectacles 20 operate as a pager with a liquid crystal or LED display 50 transcribed across the lenses 20, 21 of the spectacles. The spectacles 10 are also designed to be used as a telephone by coupling one temple 30 to a detachable keyboard assembly 60 that it can also operate as a power 25 source. The spectacles are also designed to carry solar panels 70 on the front of the frame 11 to provide an additional source of power. Alternatively, the panels may be on one or both of the arms. As a further power source, the spectacles are designed to carry a plurality of button 30 batteries (not shown) which may be located either along the temples 30, 31 or across the bridge 12 of the frame 11. The display 50 for the pager may also be coupled to a timing device that can provide a digital time piece showing hours, minutes and seconds, a digital calendar showing the

day, date, month and year and a stop watch showing elapse time. The display is alpha-numerical and has a fifty message memory. A small light 75 coupled to a beeper is positioned centrally at the top of the frame 11 of the spectacles to provide warning of an incoming message or in the case where the timing device may be used as an alarm, an audible or visual indication of activation of the alarm. Current micro-chip technology allows for an extensive memory facility in keeping with existing beeper standards.

5 spectacles to provide warning of an incoming message or in the case where the timing device may be used as an alarm, an audible or visual indication of activation of the alarm. Current micro-chip technology allows for an extensive memory facility in keeping with existing beeper standards.

10 The activation of read/stop, index/delete, review/protect, hold/shift, buzzer on/off, and L.E.D. activator can be located on the top rim of the glasses or on one of the temples 30, 31. (A maximum of five buttons are all that is necessary for complete beeper operation). Current beeper

15 features such as full display prompts, variations in alert tones/address indicators, protect function, manual and automatic scroll, low battery alert tones, repeat call detection are all incorporated utilising very little componentry.

20 In the embodiment shown in Figures 3 and 4, the alpha-numerical display 150 is positioned across the bridge 12 of the frame 11 of the spectacles. In this embodiment, once the alarm is activated, the spectacles must be slid forwardly or removed to enable the wearer to focus on the recorded message. A small part 151 of the upper portion of the lenses 20, 21 of the spectacles is designated to illustrate the time, calendar, stop watch and alarm features. This portion 151 is kept discrete so as not to impair the view through the lens of the spectacles. In the

25 embodiment shown in Figure 5, the display can be on one or both arms of the spectacles. In the embodiment shown in Figures 1 and 2, a special optical technique is used to place the message directly onto the lenses 20, 21 of the spectacles in a manner that the message can be interpreted

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by the wearer notwithstanding the fact that the lens is in close proximity to the eyes of the wearer. This imaging technique is known as "a head-up display".

The temples 30, 31 or frame 11 of the spectacles 5 incorporate a small radio receiver that is adapted to receive a paging message. Both temples are provided with a row of neatly disguised touch buttons 65, 66 that in the embodiments illustrated in Figures 1 to 4 are positioned in an array between the mid-span of each temple 30, 31 and its 10 hinged connection 32, 33 to the frame.

The spectacles are also designed to be used either as a cordless telephone or as a cellular telephone. In either case, the keyboard assembly 60 of the telephone is a separate item that can be either wired to one end 34 of one temple 30 via a detachable lead 61 as shown in Figure 1 or could be in communication with the spectacles through signalling means such as infrared or radio frequency waves. The keyboard 60 provides a variety of features conventional to telephones but can also include 15 other features such as adjustment of the timing device and use as a calculator. The keyboard may also incorporate a larger power source and houses the electrical/electronic circuitry that would be used with a conventional cellular telephone. The spectacles operate as the "handset" in that 20 each temple 30, 31 is provided with a downwardly pivotable ear piece 35, 36 or speaker. A microphone 45 is positioned adjacent the bridge 12 of the frame of the spectacles so that the wearer of the spectacles can conduct a telephone conversation by simply turning down the ear pieces 35, 36 25 so that they are positioned adjacent the ear and then speaking normally with the voice being picked up by the centrally positioned microphone 45 which would be an omnidirectional highly sensitive "dot" microphone.

It is understood that in a more simplistic

format, the spectacles may only operate as a cordless telephone with the signal being received from a receiver station positioned in the immediate proximity of the user of the wearer of the spectacles.

- 5 The power source carried by the spectacles, namely the button batteries and/or solar panels 70 are used to operate the low power facilities such as the display 50 of the pager and time piece. It is understood that the other componentry requiring greater levels of power would
10 be fed from power carried in the power pack that forms part of the keyboard assembly 60. This power pack could be rechargeable in the conventional manner. The electrical wiring for the pager, telephone and other componentry would be molded within the frame 11 and temples 30, 31 of the spectacles. The temples 30, 31 of the spectacles and the frame 11 or reinforcing wires for the frame could also act as an aerial for the radio receiver(s). The keyboard assembly could be provided with a small retractable aerial (not shown) which allows the keyboard assembly 60 to
15 20 operate as a transmitter. The lead 61 may be wound on a small spring loaded spool (not shown) carried by the keyboard assembly 60. The small switches positioned on the temples 30, 31 of the spectacles operate as mode switches controlling use and operation of the assembly as a whole.
25 Further switching means may be provided as touch sensitive pads that may be located along the top of the frames, above the lenses, and even in certain circumstances on the lenses themselves. It is further understood that the display 50 may be illuminated by a small light emitting diode so that
30 the display can be read in darkness. The facility of attachment to a separate keyboard also allows the assembly to operate as a very small personal computer and the keyboard can be used as a storage notebook for telephone numbers, addresses and personal memorandum. This

information would then be retrieved for display on the liquid crystal or LED display 50 or 150.

It should be appreciated that the display 50/150 may be provided directly on the lens of the spectacles and
5 may be achieved by the use of fibre optic means or LED means embedded in the lenses in a manner such that the wearer does not perceive the presence of the display until it is activated. Alternatively, instead of embedding the display in the lenses it may be directed onto the lens by
10 suitable optical means from a display carried by the frame itself.

The assembly described above has the advantages that by use of state of the art, electrical and electronic technology coupled with state of art technology associated
15 with telecommunications, the features of a pager, telephone, timepiece, calculator and personal computer can all be incorporated into a conventional pair of spectacles. Consequently, those who are forced to wear spectacles through poor eyesight or constantly wear sunglasses have an
20 opportunity to combine the conventional features of spectacles and sunglasses with the features usually associated with a watch, a separate handheld pager, and a telephone.

Although the embodiments described above has been
25 restricted to spectacles it is understood that the invention may equally be adapted to use with other eye screen means such as with motorcycle or bicycle helmets which may incorporate a visor. People who have to wear such equipment also frequently have a need to use a pager,
30 consult a watch or use a mobile telephone.

THE CLAIMS

1. Eye screen means such as a pair of spectacles incorporating a receiver, an alphanumeric display, and
5 means to display an alphanumeric message sensed by the receiver through the medium of the alphanumeric display.
2. Eye screen mean according to claim 1 wherein the receiver is directly in the eye screen means such as in the spectacle frames or separate and suitably interconnected therewith.
10
3. Eye screen means according to claim 1, wherein the alphanumeric display is a liquid crystal display and is positioned on the frame of the spectacles or is positioned across a portion of the one or both the lenses of the
15 spectacles.
4. Eye screen means in the form of a pair of spectacles coupled to a power pack assembly via a detachable flexible lead, the temples of the spectacles including ear phones, a microphone being positioned in the
20 frame of the spectacles whereby the eye screen means operates as a telephone.
5. Eye screen means according to claim 4 wherein the telephone is a mobile cellular telephone or adapted to receive signals from a base transmittal positioned in the
25 proximity of the wearer of the spectacles.
6. Eye screen means according to any one of the preceding claims further including solar cells and/or button batteries to provide a source of electricity.
7. Eye screen means according to any one of the
30 preceding claims further comprising light or sound emitting devices to warn the user of the presence of a paging message or telephone contact.
8. Eye screen means according to any one of the preceding claims further comprising a time chip that can

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provide indication of time, preferably in hours, minutes, seconds, date, month, day and year as well as elapsed time.

9. Eye screen means such as a pair of spectacles includes a display positioned on eye screen means such as

5 on the lenses of the spectacles, with an optical system arranged so that the display can be readily viewed by the wearer of the eye screen means notwithstanding the fact that the lenses of the spectacles are positioned very closed to the eye of the wearer.

10

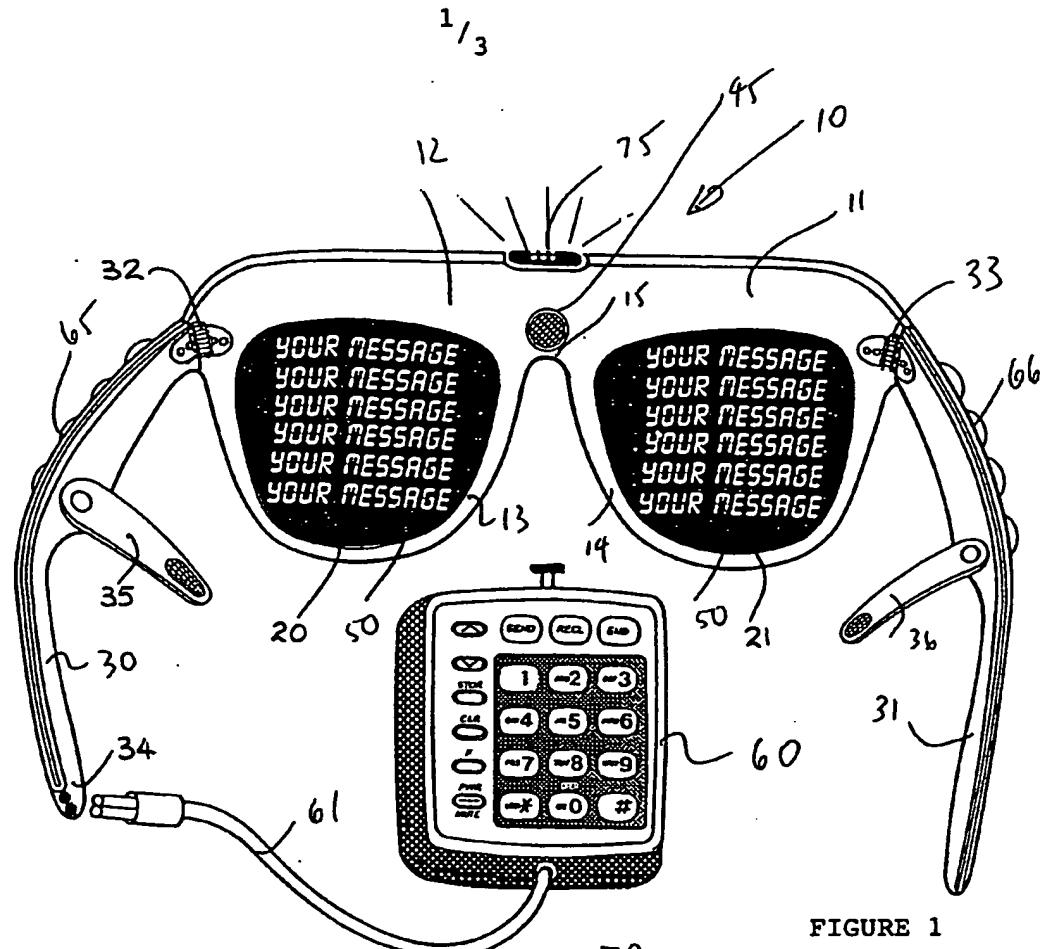


FIGURE 1

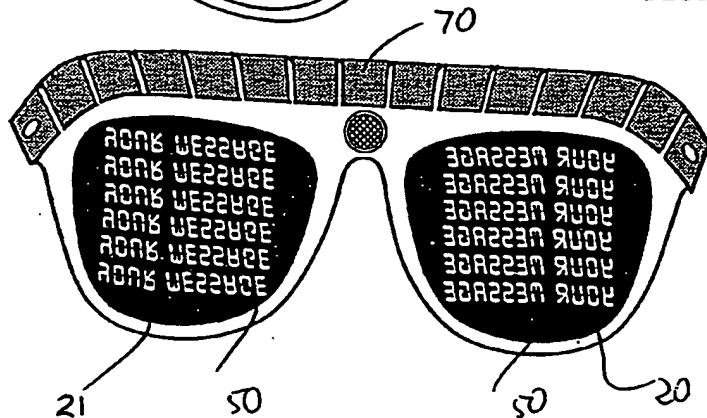


FIGURE 2

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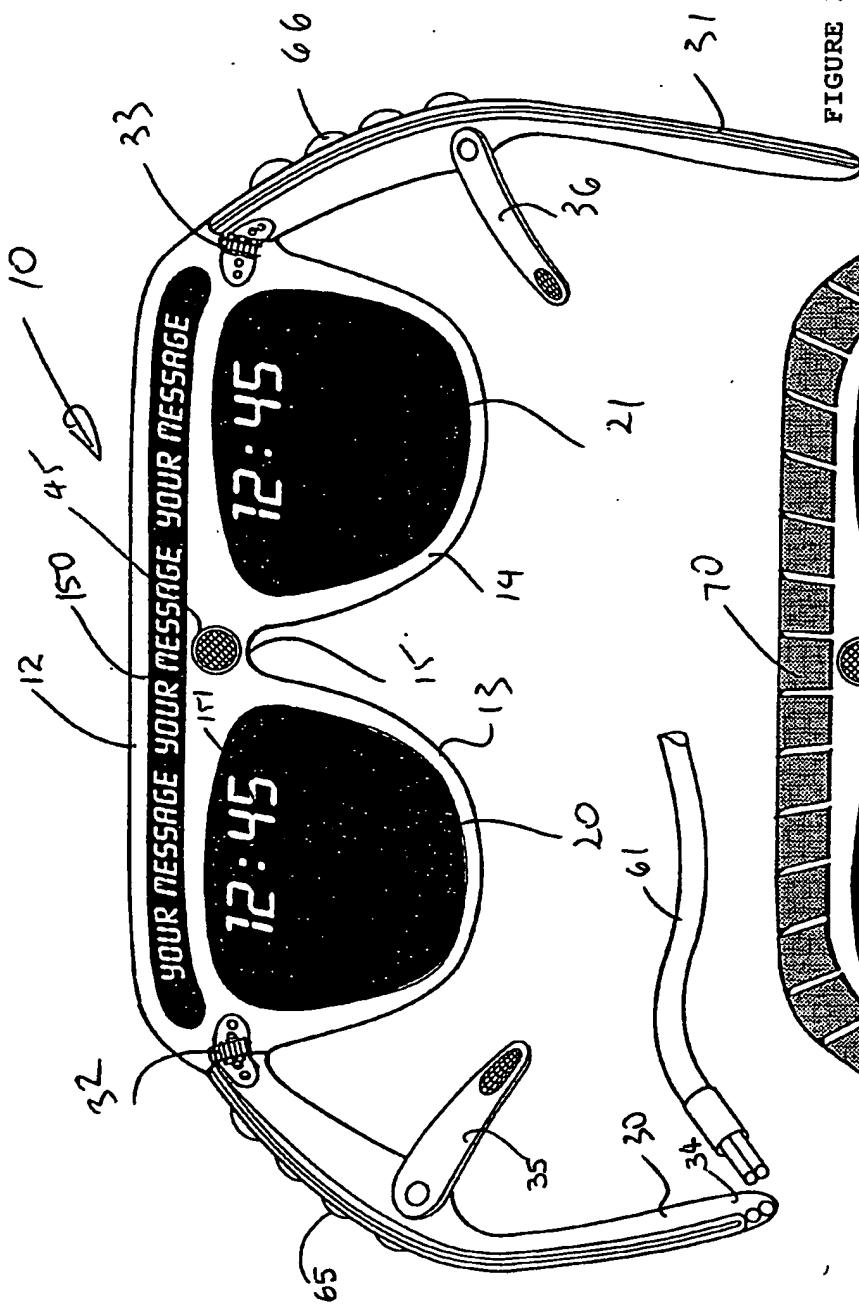


FIGURE 3

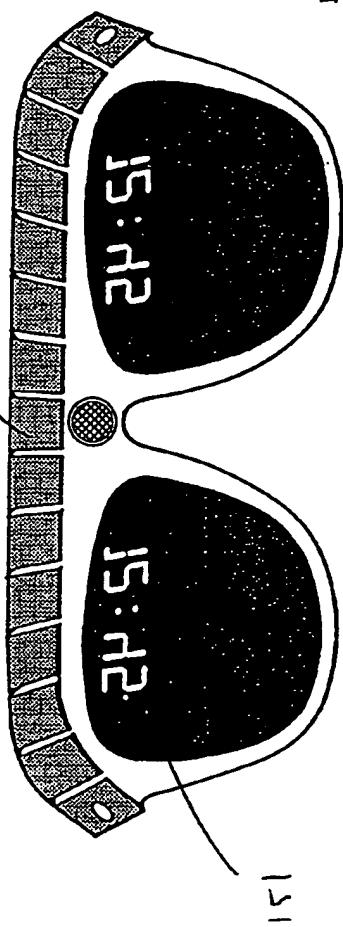


FIGURE 4

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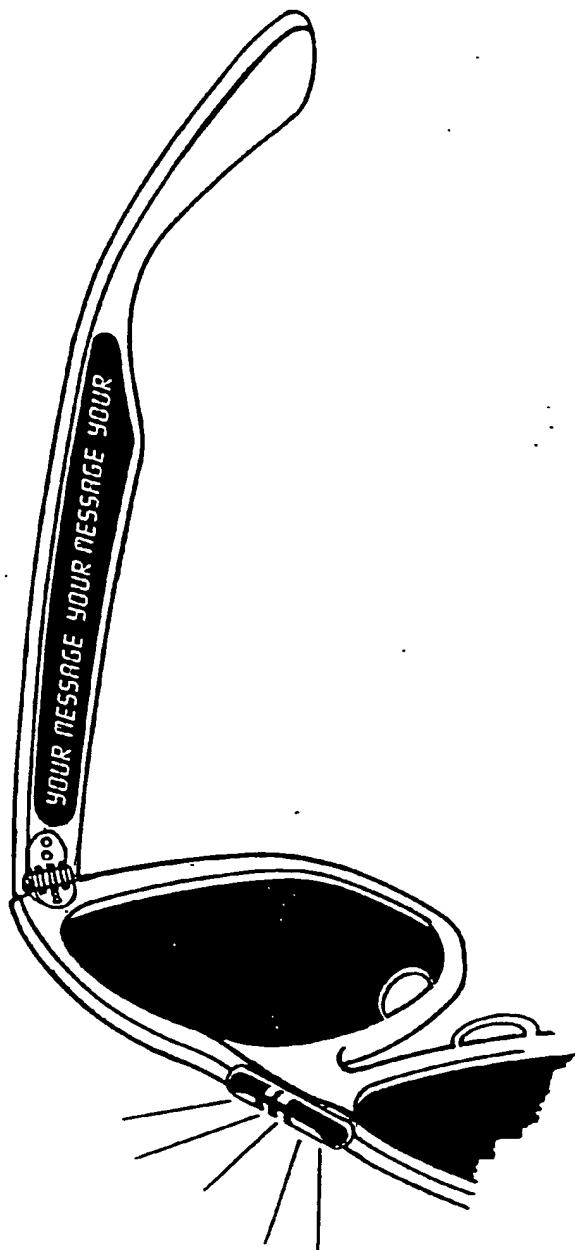


FIGURE 5

SUBSTITUTE SHEET

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 93/00537

A. CLASSIFICATION OF SUBJECT MATTER
 Int. Cl.⁵ G02C 11/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHEDMinimum documentation searched (classification system followed by classification symbols)
IPC G02C 11/00, G04B 47/00, 47/02Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU : IPC AS ABOVE PLUS g08B 5/22, 7/06, H04B 7/26, 7/005, H04M 1/05, 1/11Electronic data base consulted during the international search (name of data base, and where practicable, search terms used)
DERWENT: (Spectacles or glasses or sunglasses or goggles or eyeglass(es)) and pager # or receiver # or message #
or display: or microphone # or earphone # or telephone # or time or clock #)

JAPIO: - ditto -

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
X	Derwent Abstract Accession No. 83-783125/41 Class W05, BE,A, 896221 (WILLEME) 18 July 1983 (18.07.83) abstract	1
Y	abstract	2,3,5-8
X	DE,A, 3125964 (WEBER) 3 February 1983 (03.02.83) abstract, figures 6 and 14	1
Y	abstract, figures 6 and 14	2,3,5-8
Y	AU,A, 10407/92 (VOGT et al) 30 July 1992 (30.07.92) pages 12,13 and 15, figures 13 and 14	(continued) 2,3,6

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents :	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"B" earlier document but published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)		
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search
20 January 1994 (20.01.94)

Date of mailing of the international search report

3 FEB 1994 (3.02.94)

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 93/00537

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
Y	EP,A, 162184 (TARKANYI) 27 November 1985 (27.11.85) abstract	2,6
Y	US,A, 5020150 (SHANNON) 28 May 1991 (28.05.91) abstract	2,6
Y	DE,A, 2625654 (ZIELINSKI) 15 December 1977 (15.12.77) pages 6-8, figures 1 and 2	2,6
Y	WO,A, 91/03744 (CROWSON) 21 March 1991 (21.03.91) abstract	7
Y	DE,A, 3511263 (F A ZEISS C) 2 October 1986 (02.10.86) abstract	7
Y	Patent Abstracts of Japan, P-226, page 131, JP,A, 58-113912 (SUWA SEIKOSHA KK) 7 July 1983 (07.07.83) abstract	2,3,8
X	US,A, 4751691 (PERERA) 14 June 1988 (14.06.88) abstract	9
Y	US,A, 4751691 (PERERA) 14 June 1988 (14.06.88) abstract	3,8
X	US,A, 4796987 (LINDEN) 10 January 1989 (10.01.89) whole document	9
Y	US,A, 4796987 (LINDEN) 10 January 1989 (10.01.89) whole document	3,8
A	Patent Abstracts of Japan, E-3, page 70, JP,A, 55-8142 (NIPPON DENSHIN DENWA KOSHA) 21 January 1980 (21.01.80) abstract	4

(continuation)

Box II continued

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are three inventions:

1. Claims 1-3 defining eye screen means incorporating a receiver, an alphanumeric display and means which displays an alphanumeric message sensed by the receiver on the alphanumeric display. It is considered that eye screen means incorporating a receiver, an alphanumeric display and means which displays a message on the display comprises a first "special technical feature".
2. Claims 4 and 5 defining eye screen means including detachable flexible lead, ear phones and microphone in the frame which operates as a telephone. It is considered that eye screen means which operates as a telephone comprises a second "special technical feature".
3. Claim 9 defining eye screen means with a display and an optical system arranged so the display can be readily viewed even when the lenses of the spectacles are positioned very close to the eye of the wearer. It is considered that the eye screen means with an optical system arranged so the display can be readily viewed even when the lenses are positioned very close to the eye of the wearer comprises a third "special technical feature".

Since the abovementioned groups of claims do not share any of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 93/00537

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international search report has not established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. Claim Nos.: because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1-3 defining eye screen means which displays an alphanumeric message sensed by a receiver on an alphanumeric display.
2. Claims 4 and 5 defining eye screen means which operates as a telephone.
3. Claim 9 defining eye screen means with a display and with an optical system arranged so the display can be readily viewed even when the lenses of the spectacles are positioned very close to the eye of the wearer.
as reasoned on the extra sheet:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
 No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU 93/00537

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member				
AU	10407/92	CA	2059597			
DE	2625654	JP	52149904			
WO	9103744	AU	64346/90	EP	489852	US
DE	3511263	EP	215870	WO	8605891	
END OF ANNEX						